2021-06

NPS MPTE-Related Student Theses for Period April-June 2021

Monterey, California, Naval Postgraduate School

NPS Student MPTE-Related Thesis Topics

April-June 2021

Artificial Intelligence

Influencing Trust in Human and Artificial Intelligence Teaming through Heuristics; Thompson, Joel E.

This thesis analyzes potential methods intended to influence trust within military units and their use of artificial intelligence (AI) systems. AI systems are being developed to enhance the human decision-making process and when employed properly can greatly increase the rate at which actions are taken, a key requirement for generating combat power. Human and AI teams rely on the user's trust for the AI system, and that trust is influenced by rational, affective, and normative trust factors. This thesis examines those trust factors and determines that only rational trust factors are directly connected to the trustworthiness of the AI and that the user's trust can be influenced independently of the AI's trustworthiness through affective and normative trust factors. Influencing the user's trust of the AI through substitution of affective and normative trust factors in place of rational trust factors produces unjustified trust because this trust is not dependent on the trustworthiness of the AI.
https://calhoun.nps.edu/handle/10945/67823

Coaching, Mentoring & Sponsorship

Analysis of a Similarity-Based Approach to Positively Affect Mentor-Mentee Relationships among Service Members; Reeder, Thomas P

Currently, the United States Navy institutes a Command Sponsorship and Indoctrination Program to assist incoming service members as they settle into a new command. We focus on the scope of this program and recognize that a sponsor serves in a mentorship role to the incoming service member. The existing process outlines general selection criteria for sponsors (mentors) before they are assigned to incoming service members (mentees). In our study, we complement those criteria with a network science perspective that uses personal attributes to connect mentors and mentees with the goal of supporting a stronger connection between them. We accomplish this through a modified assignment

process, referred to as the Similarity-Based Node Pairing (SBNP) Model, that prioritizes similarity of the service members based on select attributes among both mentors and mentees.
https://calhoun.nps.edu/handle/10945/67799

Destructive Behaviors

Reducing Aviation Fatalities by Monitoring Pilots' Cognitive States Using Psychophysiological Measurements

To improve flight safety, we built a model to detect the cognitive states of pilots from their psychophysiological signals so that the aviators can be warned before falling into a dangerous mental state, including channelized attention, diverted attention, and startle/surprise. The research is composed of time series analysis and classification. We used seasonal decomposition, exponential smoothing, and autoregressive integrated moving average models to analyze the numerical psychophysiological measurements of 18 pilots and utilize such measurements to distinguish their cognitive states by classification methods, such as random forest, support vector machine, and logistic regression. The results can be a part of the risk management mechanism to alert pilots when necessary. The deliverables include a classification model of the problem and an analysis of the solutions obtained from the model.
https://calhoun.nps.edu/handle/10945/67764

Knowledge Management

Knowledge Management Within Recruiting Commands; Godfrey, Felicia L; Barkley, Eric A.

The purpose of this research is to capture and leverage tacit knowledge from Navy Recruiting Command (NRC) functions and apply knowledge management (KM) fundamentals into an accessible and transferable platform to train future recruiters. Supporting a larger research effort to research viable Navy KM strategy, the method of research used is qualitative to include literature reviews on KM, organizational change, policy and manual reviews on NRC operations, observations, and data collection from interviews. Conceptual modeling was researched and utilized to analyze tacit knowledge resources within Navy Talent Acquisition Groups. A simplified version of the Mercer Delta Congruence Model was utilized to show improved organizational performance. Lastly, this research provides the unique opportunity for future research in applications that can be applied across all Navy commands.
https://calhoun.nps.edu/handle/10945/67723

Leadership Development

Principles of Ethical Leadership: How Stoicism Can Best Prepare our Future Leaders; Donofrio, Ryan T

The ability to act ethically is a vital characteristic of a strong leader. Currently, the Navy lacks formal education on ethical frameworks. Instead, it relies on initial training, various commissioning

sources, and on-the-job training to ensure cursory knowledge, thereby leaving ethical foundations unaddressed. Moreover, reliance on traditional Consequentialist and Non-Consequentialist norms and rules leaves little room for ambiguity in the gray area so prevalent in today's decision environments. Because one cannot prepare for every ethical challenge, one must be well versed in a virtuous principles-based approach to ethics rooted in Stoic ethics. In this thesis, I discuss why Stoic philosophy is the most advantageous approach to Navy leadership training by focusing on the Principles of Stoic Leadership and how they can be put into action.
https://calhoun.nps.edu/handle/10945/67701

Learning

A Recommender Model Using Social Tie Strength for the Chunk Learning System; Critchely, Matthew F

With the onset of COVID-19, rising tuition costs, and technological advancements, online courses have become a pervasive medium through which education is conducted. Currently, several online educational services tailor education to students through various methods of recommender models. One such system, the Curated Heuristic Using a Network of Knowledge (CHUNK) Learning, developed at the Naval Postgraduate School, uses a recommender system that relies on user profile attributes.

In this work, we create a synthetic social network of learners and calculate the Jaccard Index and Pearson Correlation Coefficient similarity values to distinguish between strong and weak social ties. These tie classifications are then used to personalize content recommendations and expose users to greater breadth or depth of applicable knowledge based on current interests or job goals. We simulate recommendations for a user under different circumstances and show that our recommender system promotes the algorithmic formation of communities of learners on similar educational tracks.
https://calhoun.nps.edu/handle/10945/67690

First to Learn: An Exploration of Lifelong Learning to Enhance MCDP7; Molano, Melanie J

This thesis explores if there are conceptual elements of lifelong learning that can be used to leverage, strengthen, and expand MCDP 7's learning philosophy. In order to achieve this objective, a lifelong learning conceptual framework is constructed, comprising three themes: time frame, context, and purpose. It provides a case study on Benjamin Franklin, an empirical example of a lifelong learner who achieved extraordinary success. Using the lifelong learning conceptual framework, an analysis is conducted on MCDP 7 and the Franklin case study, comparing the lifelong learning themes in Franklin's life to those in MCDP 7. This thesis finds that MCDP 7 includes some, but not all, of the subcomponents within each lifelong learning theme that are prevalent in the Franklin case. This thesis recommends the addition of a non-formal learning context to complement formal and informal learning. Furthermore, it recommends areas for future research that can broaden MCDP 7's philosophy to increase buy-in from Marines and instill a deeper connection to learning that can be sustained over time.
https://calhoun.nps.edu/handle/10945/67784

Pandemic Lessons Learned (and Best Practices)

Processing Policy in a Pandemic, Sherman, Gregory D; Okonak, Jonathan M.; Liashek, Matthew D

The United States has no recent experience dealing with a large-scale pandemic such as COVID-19 that has clearly affected our entire culture, institutions, and way of life. This type of problem is not predictable, and its associated impacts are not easily estimated. As such, we conducted a quantitative comparison in terms of case count between the Navy's response and the United States' national response to the COVID-19 pandemic. We evaluated the timing and implementation of Navy versus national and state policies, and explored the patterns and lessons learned to benefit the Navy and Department of Defense in the future. Our study meets a substantial need to look at both entities' response from an objective standpoint and to critique those aspects that served to further benefit or hinder outcomes.
https://calhoun.nps.edu/handle/10945/67812

Performance Management

Surface Warfare Officer School 360 Degree Feedback Program: Evaluation of Division Officer Assessments; Hanisko, Joseph C; Mulanax, Joshua A.

The Surface Warfare Officer School (SWOS) 360-degree feedback program can be improved. Since the late 2000s, this program has assessed US Navy Surface Warfare Officers (SWO) at two career milestones using commercial-off-the-shelf survey instruments. No program evaluation has been done since the initial pilot in 2005. A literature review is conducted to identify best practices that improve 360-degree feedback effectiveness in programs run by civilian organizations. The research identified several best practices and found the SWOS 360 program does not adhere to most of them. Key divergences include the program's lack of clear purpose, flawed design, lack of follow-up events, and no internalized evaluation. This project recommends developing a formal instruction to govern the program, tailoring survey instruments to better suit SWO community needs, centralizing all 360 programs that assess SWOs, incorporating follow-up events, and conducting routine program evaluations. These adjustments will improve SWOS 360 program effectiveness and create competitive advantages in SWO professional development.
https://calhoun.nps.edu/handle/10945/67729

Community of Practice Model to Enhance US Navy Full-Time Support Information Technology Track Performance, Mottaleb, Ayman M.

In this case study, the researcher investigates applying the community of practice (CoP) principles to the U.S. Navy Full-Time Support officers' community serving in the IT Track (FTS-IT). This study shows how implementing CoP will improve the collaboration, training, and development of the members of the FTS-IT.

The interviews were in the form of open-ended questions and directed in a conversational style. The CoP model suggested in this study should not be regarded as a mere outcome; it is recommended to serve as the FTS-IT community's means to help its members develop, train, mentor, and network. Furthermore, the proposed CoP model is supported by virtual platforms and technologies to ensure capturing, storing, and transferring knowledge among the FTS-IT members.
https://calhoun.nps.edu/handle/10945/67787

Recruiting

A Modernized Recruit Distribution Model, Martinez, Ryan J

A crucial aspect of creating a more specialized and capable fighting force is ensuring optimal talent management. This requires assigning the best fit military occupational specialty (MOS) to over 30,000 new recruits each year. This is currently done using the Recruit Distribution Model (RDM) run at Marine Corps Manpower and Reserve Affairs (M&RA). While the RDM assigns each recruit to an MOS within the parameters of their respective contract, it is almost 40 years old, written in an outdated programming language, and does not successfully consider all aspects of talent management. The current RDM assigns each recruit an MOS that the recruit is qualified for predominantly based on school seat availability. While this model is effective, it does not optimize talent management in accordance with the Commandant's vision for a more adept and lethal organization. This thesis creates a modernized RDM written in Python that considers many more factors in optimal MOS assignment. Examples of improvements include minimizing idle time spent between training schools, maximizing goodness of fit pairings, and ensuring the assignments over the course of a year are approximately achieving M&RA staffing goals.
https://calhoun.nps.edu/handle/10945/67772

Addressing FEMA's Recruitment Challenges: Lessons from Teach for America, Ellenwood, Mikaela

Teach for America is a shining example of recruitment to national service while the government is struggling. The civil service has yet to address long-standing challenges with its organization, particularly its human capital systems that control recruitment, hiring, selection, and performance management. These challenges undermine public trust in government and also have a direct impact on recruitment. To examine the civil service's recruitment shortfalls, this study examined Teach for America's model. This study provides recommendations and a summary of findings that may inform government leaders who wish to recruit and hire young adults.
https://calhoun.nps.edu/handle/10945/67706

Raising the Standard: Analysis of the Marine Corps' Proposed Changes to the AFQT Score Requirement for Enlistment, Worner, Alex M.; Bartra, Morgan G

This research analyzes the Commandant of the Marine Corps' proposed changes to the Armed Forces Qualification Test (AFQT) score required for enlistment within the Marine Corps. The proposed change includes raising the minimum AFQT score standard from 32 to 40. This research utilized a logistic regression model to assist in identifying potential effects on the retention of first term Marines. It was identified that AFQT scores have a negative relationship to the probability of a

first term Marine submitting for reenlistment, thus, increasing the minimum AFQT score standard for enlistment has the potential to negatively impact the retention of first term Marines.
https://calhoun.nps.edu/handle/10945/67832

Resilience

Implications and Programmatic Issues of US Navy Psychological Health and Resilience Initiatives; Morgan, Mabi; Campbell, Margaret M

The purpose of this inquiry is to understand the implications of existing U.S. Navy initiatives in the mental health arena aimed at improving resilience and toughness in Sailors. This study focuses on the impact of current Navy resilience programs on Sailor psychological well-being and operational unit readiness. The research was instrumental in identifying key characteristics required to implement a successful resilience program. The objective is to deliver evidence and recommendations to remove the programmatic issues that impede the Navy's ability to move to scale.
https://calhoun.nps.edu/handle/10945/67786

Retention

Continuation of the Effects of Diversity on Retention; Wu, Wei Y.

This thesis extends on prior research on retention for minority and non-minority groups in the Navy overall, and across different geographical locations, ship classes, and Navy enlisted communities. Using a large sample on first-term enlisted Sailors' reenlistment decisions made from FY 1998 to FY 2017 in the surface warfare community, and a multivariate statistical analysis approach with a difference-in-difference design, this thesis finds that first-term black Sailors are more likely to reenlist relative to white Sailors in all ports, ship classes, and enlisted communities. However, the results show no evidence that female Sailors experience any different retention rates than their male counterparts. The findings provide a starting point for examining the culture of diversity and inclusion behaviors across the Navy to assess D&I behaviors, identify key inclusion metrics, and refine and implement D&I competencies on education and training in the fleet.
https://calhoun.nps.edu/handle/10945/67834

Marine Corps Officer Modeling: Retention Analysis Based on Source of Accession; McCarley, Kyle P.

This thesis uses survival analysis and logistic regression to model officer retention and selection board performance using data from MCRC and Manpower and Reserve Affairs (M&RA) about active-duty Marine officers commissioned between fiscal years 2006 and 2016. We find that officer survival patterns are different across the commissioning sources, even when controlling for contract type. Additionally, we demonstrate that early indicators of performance are useful predictors when modeling early- and mid-career milestone achievement. MCRC can use these tools and results to inform talent management modernization efforts and help achieve Marine officer procurement objectives to support Force Design 2030.

https://calhoun.nps.edu/handle/10945/67774

Talent Management

Personalizing Talent Development Utilizing a Network Framework, Dietz, Andrew E.

Job seekers struggle to acquire the skills demanded by the jobs they are pursuing. Furthermore, job seekers also face the challenge of navigating through the various training opportunities, since it is hard to predict what training will best prepare them for the positions they want. Is there a better way to match job seekers to the skills they need to develop? This paper examines and builds upon existing network-based systems to develop a framework that represents the environment, identifies subsets of skills and training content, and builds personalized content training plans. By developing a framework that represents the environment and addresses the challenges job seekers face, users will benefit from meaningful training as a means of preparing for their next job.
https://calhoun.nps.edu/handle/10945/67700

Predicting Midshipmen's Outcomes at the United States Naval Academy, Jamison, George R.

The goal is to identify a list of factors which company officers and senior enlisted leaders can use to help develop midshipmen morally, mentally, and physically. We used logistic regression, classification trees, and random forests to seek the most effective prediction model for midshipmen's outcomes. The results of our logistic regression model accurately identify 71.4% of midshipman who are predicted to graduate in the top 10%, and 66.7% of midshipmen who are predicted to graduate in the bottom 10%. Additionally, whole person multiple, math SAT scores, participation in extracurricular activities, Myers-Briggs Type Indicator results, and mile times are key factors for predicting the top 10%. For the bottom 10%, the key factors are whole person multiple, math SAT scores, race/ethnicity, and prior enlistment. Due to a lack of specific attrition data, attrition models were unsuccessful. This study summarizes results, makes recommendations to the United States Naval Academy, and lists potential future work for Naval Postgraduate students.
https://calhoun.nps.edu/handle/10945/67744

Telework

Analysis of Leadership Perceptions and Contracting Efficiency Within the United States Army RHCO-A Before and During the FY 20 through FY21 COVID-19 Pandemic; Harris, Tracy E; Diaz, Arturo P; Heckenkemper, William B

The study explores previous research on perceptions of telework before and during the COVID-19 pandemic along with a past report on contracting efficiency metrics within the U.S. Army. This research, along with a study on telework by the RAND Corporation, provide a foundation for the analysis of contracting efficiency metrics and leadership perceptions of telework within RHCO-A during the COVID-19 pandemic. Next, the analysis outlines RHCO-A's contracting efficiency metrics before FY20 and after a mass shift to full time telework among the RHCO-A workforce. Third, the analysis compares the telework perceptions of RHCO-A leaders before and during FY20.
https://calhoun.nps.edu/handle/10945/67735

Effective Contracting Workforce Training Tactics in a Telework Post-Pandemic Environment; Cloutier, Beth A; Hudson, Judy C; Mayfield, Robert L;, Jr; Renzella, Traci I.

Air Force Life Cycle Management Center (AFLCMC) is considering the future of the telework workforce, with an interest on private industry tactics and technologies that may improve its workforce training in the post-pandemic era. During the current COVID-19 pandemic, the Air Force (AF) recognized an increase in productivity with 100,000 Air Force personnel working remotely. Our study examines the main barriers faced during the pandemic by the AF in its ability to effectively remote-train new and current contracting (1102) personnel. We analyze data from surveys and interviews with AF personnel and private industry training personnel to catalogue the main opportunities and challenges in delivering virtual training. Given the post-pandemic workforce profile and environment for AFLCMC, we make recommendations for best practices from the private industry that may increase training efficiency for the contracting (1102) workforce in post-pandemic environment.
https://calhoun.nps.edu/handle/10945/67687

Implementing Post-Pandemic, Maximized Telework Initiatives Within the USTRANSCOM Acquisition Directorate; Lyman, Shanda L

The current telework environment was implemented swiftly for safety reasons. After the pandemic, the world will see many lasting historical effects of this time, one being telework as a "new business practice" normal. Private industry will likely eliminate office space, thus reducing overhead, and move toward permanent telework. For the USTRANSCOM-AQ Directorate to recruit and retain the most talented contracting professionals, they will need to offer this benefit to compete with private industry. This analysis examines the current satisfaction rate of teleworking within USTRANSCOM-AQ and what additional policy elements, such as motivation and empowerment, IT resources and collaboration tools, and training, are needed to fully implement maximized telework initiatives post-pandemic.
https://calhoun.nps.edu/handle/10945/67767

Training

The Effect of Self-Monitoring and the Big Five Personality Traits on Social Relationships Development: A Mixed Methods Case Study of Officer and Enlisted Intelligence in Career-Level Training, Schotter, Robert C.

This mixed methods comparative case study examined the effects of the Big Five personality traits and facets, and acquisitive and protective self-monitoring constructs, on the development of social relationships in two classes of Marine Corps officer and enlisted personnel attending career-level intelligence training. The most significant finding to extant Big Five and self-monitoring network research is that understanding participants' network of relationships and how they make sense of and approach social situations is critical when assessing and explaining personality's effect on relationship development. The findings illustrate that both preexisting and other relationships between participants

can have an outsized role in developing additional relationships, which, in turn, can limit personality's relevance to relationship development.
https://calhoun.nps.edu/handle/10945/67810

Virtualized Platforms to Conduct Remote Shipboard Training and Hands-On Readiness Assessment for CANES, Holloway, Rashaunda; Frye, Eugene T.

This thesis proposes that a delivery mechanism to provide additional hands-on training can offer a solution for IT administrators and improve their ability to respond during daily operations and training assessments. The main objective behind the research in this thesis is to help information system technicians who are depended upon to manage mission-critical networks. By better understanding the gaps these technicians face in training, coupled with current and emerging technology, we can begin to develop a plan of action to address these shortfalls. This thesis concludes that additional hands-on training through virtualization is vital in preparing Sailors to manage and operate CANES. Finally, investing more time and research into improving training models while focusing on the human element in training will ultimately result in ready and equipped Sailors to manage and protect mission-critical networks.
https://calhoun.nps.edu/handle/10945/67740